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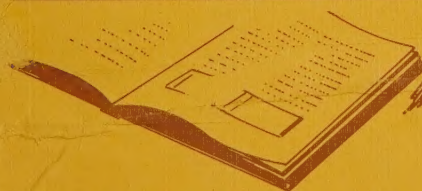
HEATHKIT[®] MANUAL

for the

SOLDERING IRON
Model GH-17A

Series # 09-42804

595-1094-07



HEATH COMPANY • BENTON HARBOR, MICHIGAN

YOUR HEATHKIT 90-DAY LIMITED WARRANTY

Consumer Protection Plan for Heathkit Consumer Products

Welcome to the Heath family. We believe you will enjoy assembling your kit and will be pleased with its performance. Please read this Consumer Protection Plan carefully. It is a "LIMITED WARRANTY" as defined in the U.S. Consumer Product Warranty and Federal Trade Commission Improvement Act. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Heath's Responsibility

PARTS — Replacements for factory defective parts will be supplied free for 90 days from date of purchase. Replacement parts are warranted for the remaining portion of the original warranty period. You can obtain warranty parts direct from Heath Company by writing or telephoning us at (616) 982-3571. And we will pay shipping charges to get those parts to you . . . anywhere in the world.

SERVICE LABOR — For a period of 90 days from the date of purchase, any malfunction caused by defective parts or error in design will be corrected at no charge to you. You must deliver the unit at your expense to the Heath factory, any Heathkit Electronic Center (units of Veritechnology Electronics Corporation), or any of our authorized overseas distributors.

TECHNICAL CONSULTATION — You will receive free consultation on any problem you might encounter in the assembly or use of your Heathkit product. Just drop us a line or give us a call. Sorry, we cannot accept collect calls.

NOT COVERED — The correction of assembly errors, adjustments, calibration, and damage due to misuse, abuse, or negligence are not covered by the warranty. Use of corrosive solder and/or the unauthorized modification of the product or of any furnished component will void this warranty in its entirety. This warranty does not include reimbursement for inconvenience, loss of use, customer assembly, set-up time, or unauthorized service.

This warranty covers only Heath products and is not extended to other equipment or components that a customer uses in conjunction with our products.

SUCH REPAIR AND REPLACEMENT SHALL BE THE SOLE REMEDY OF THE CUSTOMER AND THERE SHALL BE NO LIABILITY ON THE PART OF HEATH FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO ANY LOSS OF BUSINESS OR PROFITS, WHETHER OR NOT FORSEEABLE.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

Owner's Responsibility

EFFECTIVE WARRANTY DATE — Warranty begins on the date of first consumer purchase. You must supply a copy of your proof of purchase when you request warranty service or parts.

ASSEMBLY — Before seeking warranty service, you should complete the assembly by carefully following the manual instructions. Heathkit service agencies cannot complete assembly and adjustments that are customer's responsibility.

ACCESSORY EQUIPMENT — Performance malfunctions involving other non-Heath accessory equipment, (antennas, audio components, computer peripherals and software, etc.) are not covered by this warranty and are the owner's responsibility.

SHIPPING UNITS — Follow the packing instructions published in the assembly manuals. Damage due to inadequate packing cannot be repaired under warranty.

If you are not satisfied with our service (warranty or otherwise) or our products, write directly to our Director of Customer Service, Heath Company, Benton Harbor MI 49022. He will make certain your problems receive immediate, personal attention.

HEATH COMPANY PHONE DIRECTORY

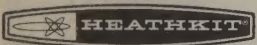
The following telephone numbers are direct lines to the departments listed.

Kit orders and delivery information	(616) 982-3411
Credit	(616) 982-3561
Replacement Parts	(616) 982-3571

Technical Assistance Phone Numbers

8:00 A.M. to 12 P.M. and 1:00 P.M. to 4:30 P.M., EST, Weekdays Only	
R.C. Audio, and Electronic Organs	(616) 982-3310
Amateur Radio	(616) 982-3296
Test Equipment, Weather Instruments and	
Home Clocks	(616) 982-3315
Television	(616) 982-3307
Aircraft, Marine, Security, Scanners, Automotive,	
Appliances and General Products	(616) 982-3496
Computers	(616) 982-3309

Assembly and Operation of the



SOLDERING IRON
MODEL GH- 17A

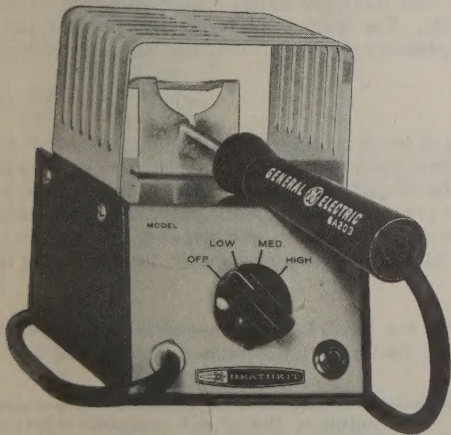


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HEATH COMPANY
BENTON HARBOR, MICHIGAN 49022

INTRODUCTION

Your new Heathkit Soldering Iron is designed specifically for soldering electronic circuits. There are three different switch-selected heat ranges to meet all of your normal soldering requirements. The handle will remain cool and will not become uncomfortable to hold, even when the soldering iron is used continuously.

The location of the heating element in the tip of the iron puts the heat right where you need it. The step-down power transformer permits the use of a low-voltage heating element to eliminate shock hazards, and practically removes any chance of power-line short circuits.

The three-wire line cord is an added safety feature. When the line cord is connected to a grounded outlet, the soldering iron chassis is at ground potential providing an additional safety factor.

The slim, beveled soldering tip can be used in the hard-to-get-to places that are too "tight" for many other soldering irons and guns. The six-foot cord gives you plenty of freedom to move the iron about. Because the soldering iron tip is iron-clad, it requires very little maintenance. (Maintenance information is given later in the manual.)

A "lock-in" holder retains the iron when it is not in use. This feature will hold the hot iron in place if it is bumped accidentally, but will also allow the iron to be inserted and removed

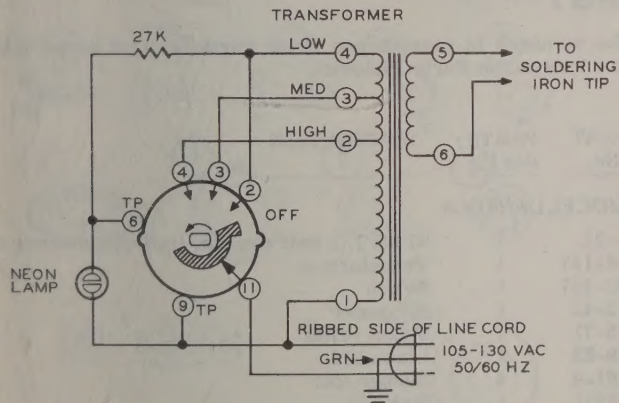
easily. For soldering that requires both hands to hold the work, provision is made to hold the iron so the soldering tip is accessible, leaving both hands free.

The circuit of the Soldering Iron consists mainly of the step-down transformer and Heat Range switch as shown on the Schematic Diagram. The neon pilot lamp is connected across the transformer primary winding to indicate when the Soldering Iron is turned on.

Each position of the Heat Range switch, except the OFF position, selects a different primary tap on the transformer. The tap used determines the step-down voltage ratio of the transformer; the HIGH position provides a lower ratio than the MED position, etc. The lower the step-down ratio, the higher the secondary voltage, and thus the higher the temperature of the soldering iron tip.

After you check the Parts List and assemble your Soldering Iron, be sure to read the Operation section in the back of the manual.

Refer to the "Kit Builders Guide" for complete information on unpacking, parts identification, tools, wiring, soldering, and step-by-step assembly procedures.



SCHEMATIC OF THE HEATHKIT[®] SOLDERING IRON MODEL GH-17A

1. SWITCH SHOWN IN FULL CLOCKWISE POSITION AS VIEWED FROM THE REAR.
2. K = 1000 OHMS.
3. TP = TIEPOINT.
4.  = CHASSIS GROUND.

PARTS LIST

To order replacement parts, refer to the Replacement Parts Price List and use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Replacement Parts" inside the rear cover of the Manual. For pricing information, refer to separate "Heath Parts Price List."

The numbers in parentheses in the Parts List are keyed to the numbers on the Parts Pictorial.

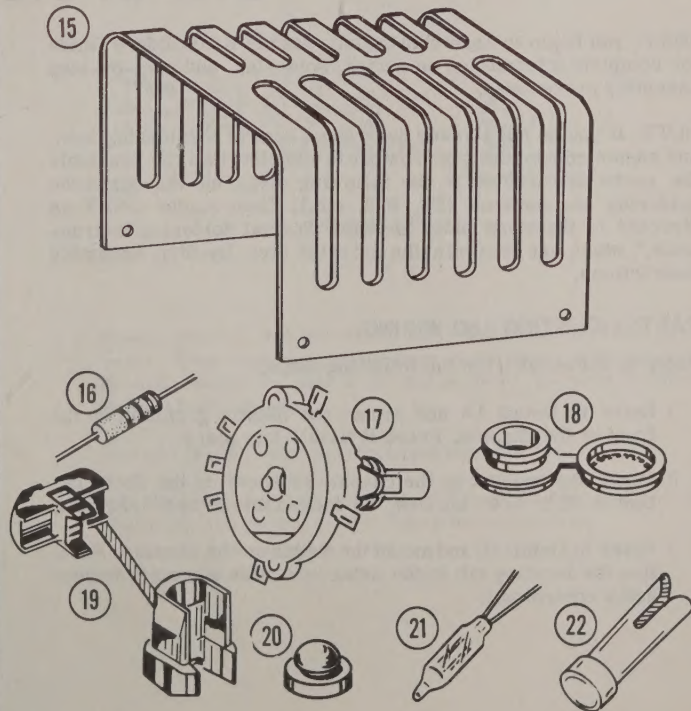
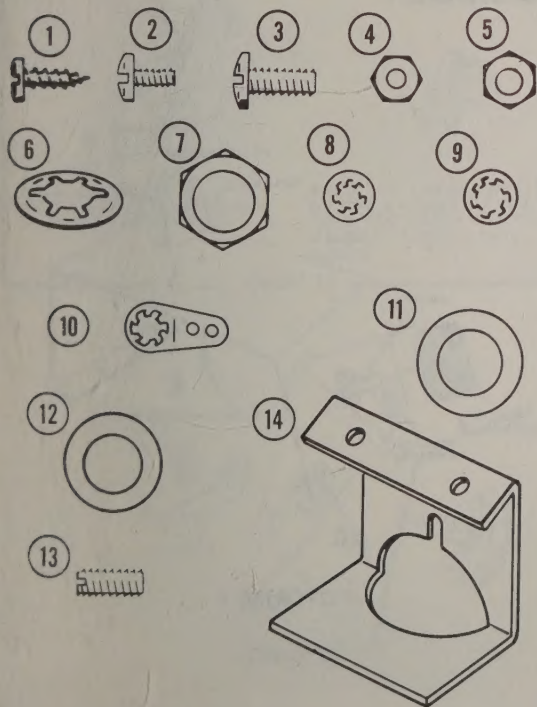
PART No.	PARTS Per Kit	DESCRIPTION
HARDWARE		
(1) 250-8	8	#6 sheet metal screw
(2) 250-56	2	6-32 x 1/4" screw
(3) 250-137	2	8-32 x 3/8" screw
(4) 252-3	2	6-32 nut
(5) 252-4	2	8-32 nut
(6) 252-73	1	5/16" speednut
(7) 252-7	1	Control nut
(8) 254-1	2	#6 lockwasher
(9) 254-2	3	#8 lockwasher
(10) 259-2	1	#8 solder lug
(11) 253-10	1	Control washer
(12) 253-86	1	5/16" nickel-plated washer
(13) 250-1193	1	8-32 x 3/8" setscrew

METAL PARTS

90-1209-1	1	Base
90-1205-1	1	Chassis
(14) 204-782	1	Bracket
(15) 206-347	1	Shield

PART No.	PARTS Per Kit	DESCRIPTION
MISCELLANEOUS		
(16) 1-23	1	27 k Ω 1/2 watt resistor (red-violet-orange)
54-187	1	Transformer
(17) 63-467	1	Switch
(18) 73-43	1	Grommet
(19) 75-71	1	Strain relief
89-23	1	Line cord
(20) 261-4	4	Rubber foot
346-1	1	Sleeving
(21) 412-15	1	Neon lamp
(22) 413-10	1	Plastic lens
462-24	1	Knob
490-69	1	Black cord, handle, and formed wire support
490-108	1	Soldering iron tip
391-34	1	Blue and white identification label
597-260	1	Parts Order Form
597-308	1	Kit Builders Guide
	1	Manual (see front cover for part number)
		Solder

PARTS PICTORIAL



STEP-BY-STEP ASSEMBLY

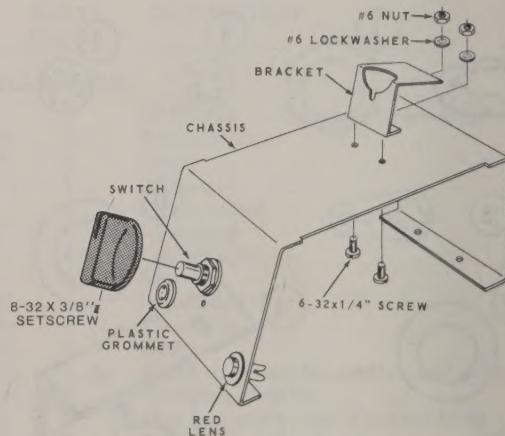
Before you begin to assemble the kit, read the Kit Builders Guide for complete information on wiring, soldering, and step-by-step assembly procedures.

NOTE: If you do not already have some sort of a soldering iron, and cannot conveniently borrow one to complete this kit, assemble the parts as directed in the following steps but disregard the soldering instructions (NS, S-2, etc.). Then solder **ONLY** as directed in the steps under the title "Special Soldering Instructions," which are located at the end of the Step-By-Step Assembly instructions.

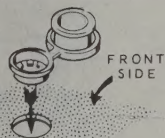
PARTS MOUNTING AND WIRING

Refer to Pictorial 1 for the following steps.

- () Refer to Detail 1A and mount the plastic grommet on the front of the chassis. Press it firmly into place.
- () Mount the bracket on the chassis as shown in the Pictorial. Use 6-32 x 1/4" screws, #6 lockwashers, and 6-32 nuts.
- () Refer to Detail 1B and mount the switch on the chassis. Position the locating tab in the index hole. Use a control washer and a control nut.



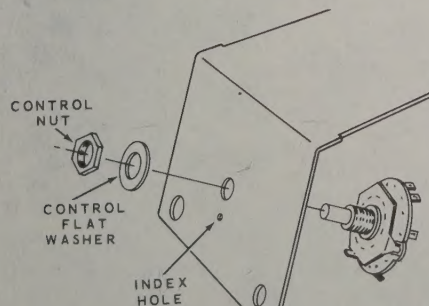
PICTORIAL 1



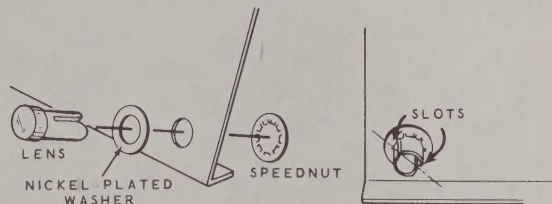
POSITION THE SMALL PORTION OF THE GROMMET OVER THE CHASSIS HOLE.

BEND THE LARGE PORTION OF THE GROMMET OVER AND INTO THE SMALL PORTION. PRESS IT FIRMLY INTO PLACE.

Detail 1A

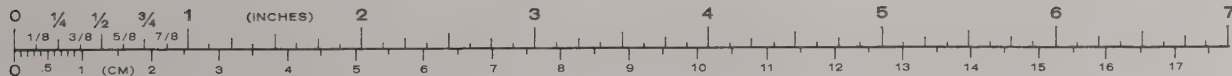
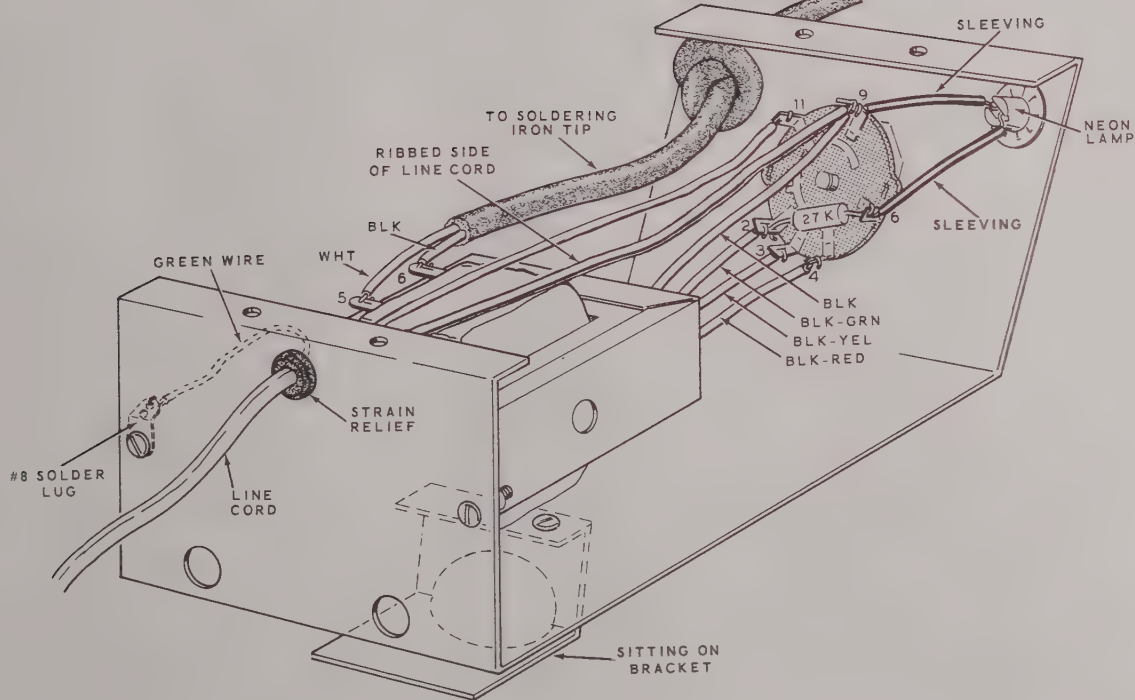


Detail 1B

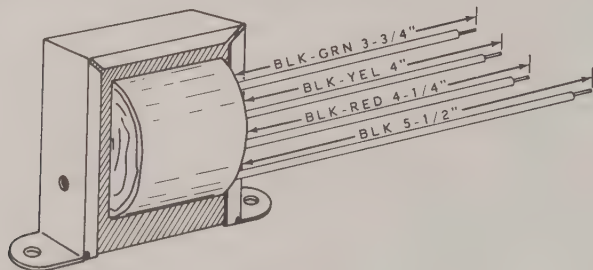


Detail 1C

- () Refer to Detail 1C and pass the red plastic lens through the nickel-plated washer. Mount these parts on the front of the chassis as shown in the Pictorial. Position the slots in the lens as shown, and press the 5/16" speednut firmly into place.
- () Start an 8-32 x 3/8" setscrew in the tapped hole of the knob.
- () Turn the switch shaft fully counterclockwise and install the knob with its white index mark pointing to OFF. Tighten the setscrew firmly.



PICTORIAL 2



Detail 2A

Refer to Pictorial 2 for the following steps.

- () Connect the 27 k Ω (red-violet-orange) resistor between lugs 2 (NS) and 6 (NS) of the switch.
- () Cut off two 7/8" lengths of sleeving and place one on each lead of the neon lamp.
- () Push the neon lamp into the red lens as far as possible. Then bend one lead through a slot in the lens and connect it to lug 9 of the switch (NS). Similarly, connect the other lead to lug 6 of the switch (S-2).

Refer to Detail 2A and cut the transformer leads to the following lengths. Measure each lead from the point where it emerges from the transformer winding:

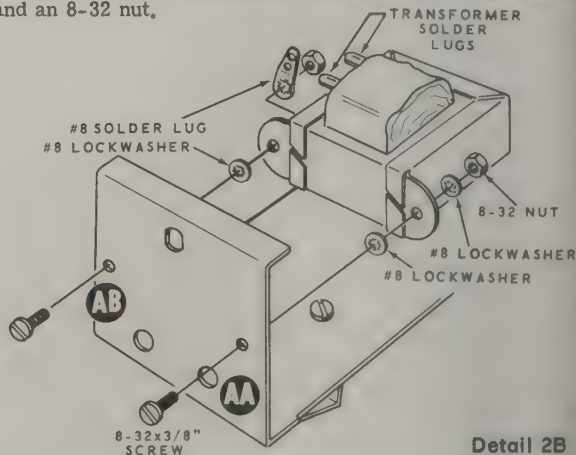
- () Black-green 3-3/4"
- () Black-yellow 4"

() Black-red 4-1/4"

() Black 5-1/2"

- () Remove 1/4" of insulation from the end of each lead and twist the bared wires in each end uniformly together to avoid any stray strands.

- () Refer to Detail 2B and mount the transformer on the back of the chassis. Position the two transformer solder lugs as shown. At mounting hole AA, use an 8-32 x 3/8" screw, two #8 lockwashers, and an 8-32 nut. At mounting hole AB use an 8-32 x 3/8" screw, a #8 lockwasher, a #8 solder lug and an 8-32 nut.



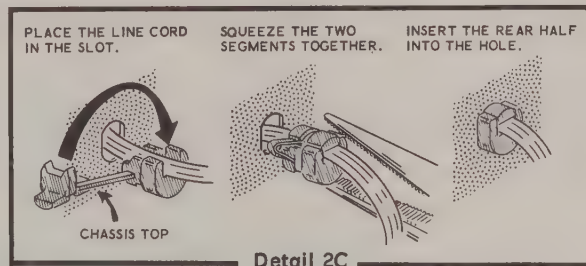
Detail 2B

connect the transformer leads to the switch lugs as follows:

-) Black-red to lug 4 (S-1).
-) Black-yellow to lug 3 (S-1).
-) Black-green to lug 2 (S-2).
-) Black to lug 9 (NS).
-) Locate the line cord and separate the three wires for about 5". Be careful not to damage the insulation.
-) Cut the green wire to 2-1/4".
-) If not already done, remove at least 1/4" of insulation from the end of each wire. Twist the ends of the bared strands of each wire to prevent fraying.
-) Insert 6" of the line cord through the hole in the back of the chassis.
-) Connect the ribbed side of the line cord to lug 9 of the switch (S-3).
-) Connect the green wire to the #8 solder lug (S-1).
-) Connect the remaining wire of the line cord to lug 11 of the switch (S-1).

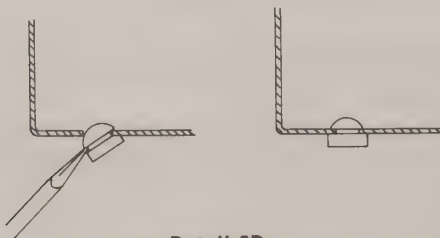
NOTE: If you have difficulty getting the strain relief and line cord into the hole, squeeze the two parts of the strain relief together with pliers and then insert the strain relief into the hole.

-) Refer to Detail 2C and install the strain relief on the line cord in the back of the chassis.



- () Locate the black cord and handle assembly.
 - () A black wire and a white wire protrude from one end of the 2-conductor black cord. Cut off the solder lugs from the ends of these wires.
- NOTE: The formed-wire soldering iron support packed with the black cord (and handle) may be used under "Special Soldering Instructions".
- () Cut the white wire to a length of 2" and the black wire to a length of 1-1/4". Remove 1/4" of insulation from the end of each.
 - () Pass enough of the black 2-conductor cord through the plastic grommet so that you can tie a knot in the cord and still have 4-1/4" total length beyond the knot.

- () Connect the white wire to lug 5 of the transformer (S-1), and the black wire to lug 6 (S-1).
- () Adjust the knot in the black cord so that there is no strain on the transformer connections when the cord is pulled from outside the chassis.
- () Refer to Detail 2D and install one rubber foot at each corner of the base in the holes provided. Press and twist the rounded portion of the foot through the hole with a small screwdriver until the foot is seated as shown.



Detail 2D

This completes the parts mounting and wiring of your Heathkit Soldering Iron. If all of the connections have been soldered, carefully examine them to be sure of good solder joints, and to see that no short circuits exist between wires or connections.

Shake the cabinet to dislodge any bits of solder or wire end that may have dropped into the wiring during assembly.

NOTE: If you have soldered the connections in the foregoing steps proceed to the Initial Test section. If you have not soldered the connections, refer to the following Special Soldering Instructions.

SPECIAL SOLDERING INSTRUCTIONS

- () Be sure all wires are tightly bent or crimped around their connecting points. If any wires are loose, crimp them tightly to their solder lugs with long-nose pliers.

CAUTION: Do not, under any circumstances, solder any connections in the following steps while the line cord is plugged into an electrical outlet. This could cause you to receive a severe electrical shock.

- () Screw the soldering iron tip firmly into the black handle.
- () Turn the switch to HIGH.
- () Plug the line cord into a 105 to 130 volts AC electrical outlet. The pilot lamp should light. If the iron is heating properly, after about 30 seconds it will "sizzle" when moisture is applied to it.
- () If the iron tip does not heat, DISCONNECT THE LINE CORD and recrimp the wires to provide a tight mechanical connection which will permit current to flow and cause the iron to heat. Then reconnect the line cord plug to the electrical outlet and proceed with the following steps.

-) Tin the tip of the iron as soon as the iron is hot enough to melt the solder as described in the Maintenance section.
-) When the iron is heating satisfactorily, and after the tip has been tinned, let it heat for another minute. THEN DISCONNECT THE LINE CORD FROM THE ELECTRIC OUTLET.
-) Quickly apply a very small amount of solder to the tip of the hot iron (to aid in transferring the heat) and solder as many as possible of the prepared connections before the iron cools off.

- () Put the soldering iron down on the formed-wire soldering iron support, and again insert the line cord plug into the electric outlet.
- () When the iron has reheated, again REMOVE THE LINE CORD FROM THE ELECTRIC OUTLET and solder more connections.
- () Repeat the steps above until all of the connections have been soldered satisfactorily.

Now proceed to the Initial Test section.

INITIAL TEST

-) If not done previously, screw the soldering iron tip firmly into the black handle.
-) Turn the switch to OFF.
-) Position the iron in the bracket as shown in Figure 1 in the Operation section.
-) Plug the line cord into a 105-130 volts AC electrical outlet.

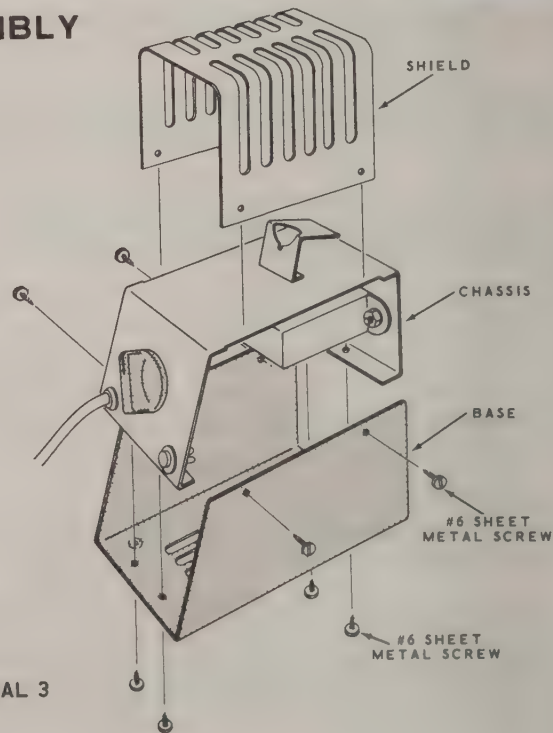
NOTE: If the Soldering Iron does not perform as expected in the following steps, turn the switch to OFF, remove the line cord from the electric outlet, and refer to the In Case of Difficulty section.

- () Turn the switch to LOW. The pilot lamp should light and the iron tip should start to heat.
- () As soon as the tip is hot enough to melt solder, tin the tip as described in the Maintenance section.
- () Turn the switch to MED and HIGH. The pilot lamp should glow progressively brighter for each position.
- () Unplug the line cord and proceed to Final Assembly.

FINAL ASSEMBLY

- () Refer to Pictorial 3 and assemble the chassis, base, and shield. Insert four #6 sheet metal screws through the base into the lips of the chassis. Then insert two #6 sheet metal screws through each side of the base into the shield.
- () Carefully peel away the backing paper from the blue and white identification label. Then press the label onto the rear of the chassis or bottom of the base. Be sure to refer to the numbers on this label in any communications you have with the Heath Company about this kit.

This completes the assembly of your Heathkit Soldering Iron.



PICTORIAL 3

OPERATION

GENERAL

- () Place the soldering iron in its bracket as shown in Figure 1.
- () Plug the line cord into a 105-130 volts AC electrical outlet.
- () Turn the switch to LOW. The pilot light will come on and the iron tip will start to heat.

NOTE: The LOW switch position keeps the soldering iron tip warm so it will reach higher temperatures quickly when the switch is turned to MED or HIGH. Use the switch position which provides the tip temperature you want for the job at hand. Return the switch to LOW when you have a few minutes between actual soldering operations. This lower heat will extend the life of the tip.

Figure 1 shows the position of the Soldering Iron when it is not in use. With the iron in this position, the hot tip rests under the shield, preventing accidental contact.

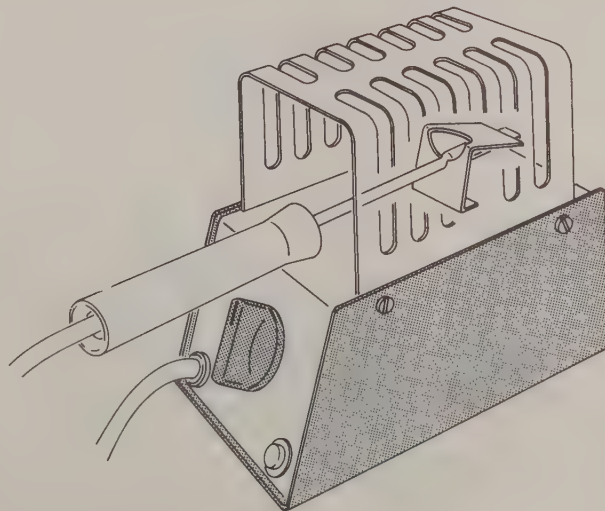


Figure 1

Figure 2 shows the handle of the soldering iron clipped into the bracket under the shield. With the iron in this position you have both hands free for handling the work to be soldered.

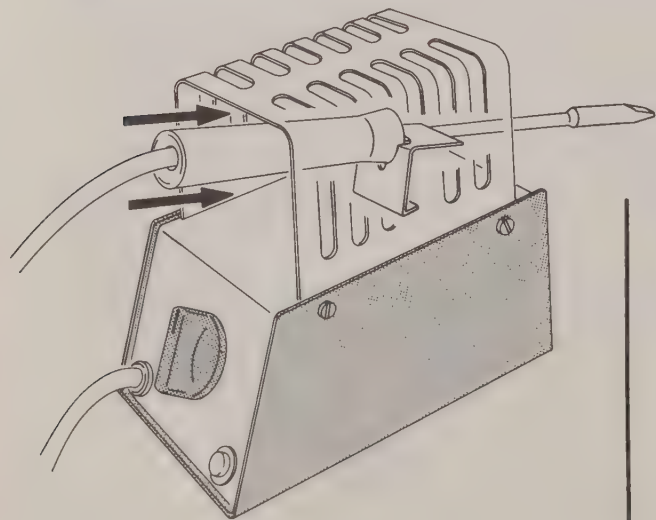


Figure 2

MAINTENANCE

The soldering iron tip is made of copper, coated with a thin layer of iron. Proper care of the soldering tip is essential. Keep the following points in mind whenever you use the Soldering Iron:

1. "Tin" the tip of the iron with solder each time it is turned on. Apply solder to the tip just as soon as it is hot enough to melt the solder. See Figure 3.
2. When the iron is in use, wipe the tip with a cloth from time to time; then re-tin the tip. See Figure 4.

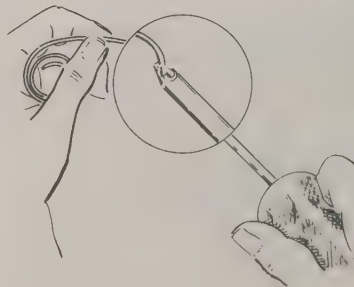


Figure 3



Figure 4

Cleaning the tip is rarely necessary because it is iron-clad. When necessary, clean the hot tip, using one of the following methods. After cleaning, tin the tip with solder. **DO NOT CLEAN THE TIP TOO VIGOROUSLY; the thin iron coating of the tip could be damaged. NEVER FILE THE TIP.**

- Scrape the tip lightly with a knife blade held at a right angle to the tip. See Figure 5.
- Smooth the tip with a fine grade of emery cloth. See Figure 6.

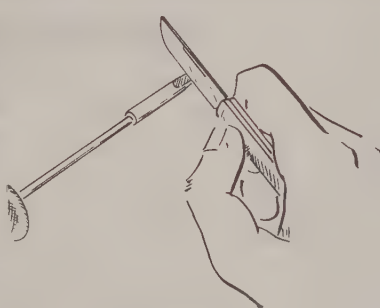


Figure 5

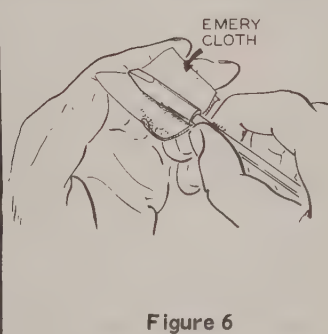


Figure 6

IN CASE OF DIFFICULTY

Recheck the wiring. Trace each lead in colored pencil on the Pictorial as it is checked. Have a friend check your work. Someone who is not familiar with the unit may notice something you have overlooked.

About 90% of the kits that are returned for repair do not function properly due to poor connections and soldering. Therefore, many troubles can be eliminated by reheating all connections to make sure that they are soldered as described in the Soldering section of the Kit Builders Guide.

Make sure the soldering iron tip is screwed snugly into its handle.

- Check for bits of solder, wire ends or other foreign matter which may be lodged in the wiring.
- If, after careful checks, the trouble is still not located and a voltmeter is available, check voltage readings. For 120 volts line input, the voltages at the Soldering Iron cord terminals of the transformer should be as listed below. These voltages are given only for reference purposes and may vary slightly:

LOW	MED	HIGH
4.5 VAC	5.5 VAC	6.5 VAC

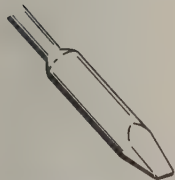
NOTE: In an extreme case where you are unable to resolve a difficulty, refer to the "Customer Service" information inside the rear cover of the Manual. Your Warranty is located inside the front cover.

SPECIFICATIONS

Soldering Iron Type.	6 volt, 25 watt element (nominal), with 3/16" chisel, iron-clad tip.
Heat Ranges.	Three different heat ranges are available; LOW-20W, MED-22W, HIGH-24W.
Switch.	Heat Range switch with OFF, LOW, MED, and HIGH positions
Transformer.	The transformer has tapped primary windings.
Power Requirements.	105 to 130 volts AC, 50/60 Hz.
Soldering Iron Dimensions.	8" long with 6 foot heavy-duty cord.
Cabinet Dimensions.	5-1/8" high x 3-5/8" wide x 5-1/2" deep.
Net Weight.	3 lbs.

The Heath Company reserves the right to discontinue products and to change specifications at any time without incurring any obligation to incorporate new features in products previously sold.

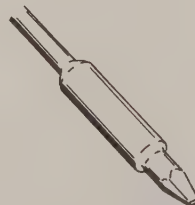
ACCESSORY TIPS



1/4" CHISEL TIP
#490-70



3/16" CHISEL TIP
#490-108



3/16" PYRAMID TIP
#490-107

Figure 7

Figure 7 illustrates three different soldering iron tips available. Part number 490-108 is identical to the one furnished with your GH-17A Soldering Iron kit. The other two tips are offered for special requirements. All three tips will also fit the older Models GH-17 and GH-52 Soldering Irons.

CUSTOMER SERVICE

REPLACEMENT PARTS

Please provide complete information when you request replacements from either the factory or Heath Electronic Centers. Be certain to include the **HEATH** part number exactly as it appears in the parts list.

Replacement parts are maintained specifically to repair Heath products. Parts sales for other reasons will be declined.

ORDERING FROM THE FACTORY

Print all of the information requested on the parts order form furnished with this product and mail it to Heath. For telephone orders (parts only) dial 616 982-3571. If you are unable to locate an order form, write us a letter or card including:

- Heath part number.
- Model number.
- Date of purchase.
- Location purchased or invoice number.
- Nature of the defect.
- Your payment or authorization for COD shipment of parts not covered by warranty.

Mail letters to: Heath Company
Benton Harbor
MI 49022
Attn: Parts Replacement

Retain original parts until you receive replacements. Parts that should be returned to the factory will be listed on your packing slip.

OBTAINING REPLACEMENTS FROM HEATH ELECTRONIC CENTERS

For your convenience, "over the counter" replacement parts are available from the Heath Electronic Centers listed in your catalog. Be sure to bring in the original part and purchase invoice when you request a warranty replacement from a Heath Electronic Center.

TECHNICAL CONSULTATION

Need help with your kit? — Self-Service? — Construction? — Operation? — Call or write for assistance. you'll find our Technical Consultants eager to help with just about any technical problem except "customizing" for unique applications.

The effectiveness of our consultation service depends on the information you furnish. Be sure to tell us:

- The Model number and Series number from the blue and white label.
- The date of purchase.
- An exact description of the difficulty.
- Everything you have done in attempting to correct the problem.

Also include switch positions, connections to other units, operating procedures, voltage readings, and any other information you think might be helpful.

Please do not send parts for testing, unless this is specifically requested by our Consultants.

Hints: Telephone traffic is lightest at midweek — please be sure your Manual and notes are on hand when you call.

Heathkit Electronic Center facilities are also available for telephone or "walk-in" personal assistance.

REPAIR SERVICE

Service facilities are available, if they are needed, to repair your completed kit. (Kits that have been modified, soldered with paste flux or acid core solder, cannot be accepted for repair.)

If it is convenient, personally deliver your kit to a Heathkit Electronic Center. For warranty parts replacement, supply a copy of the invoice or sales slip.

If you prefer to ship your kit to the factory, attach a letter containing the following information directly to the unit:

- Your name and address.
- Date of purchase and invoice number.
- Copies of all correspondence relevant to the service of the kit.
- A brief description of the difficulty.
- Authorization to return your kit COD for the service and shipping charges. (This will reduce the possibility of delay.)

Check the equipment to see that all screws and parts are secured. (Do not include any wooden cabinets or color television picture tubes, as these are easily damaged in shipment. Do not include the kit Manual.) Place the equipment in a strong carton with at least **THREE INCHES** of *resilient* packing material (shredded paper, excelsior, etc.) on all sides. Use additional packing material where there are protrusions (control sticks, large knobs, etc.). If the unit weighs over 15 lbs., place this carton in another one with 3/4" of packing material between the two.

Seal the carton with reinforced gummed tape, tie it with a strong cord, and mark it "Fragile" on at least two sides. Remember, the carrier will not accept liability for shipping damage if the unit is insufficiently packed. Ship by prepaid express, United Parcel Service, or insured Parcel Post to:

Heath Company
Service Department
Benton Harbor, Michigan 49022



MP MASTER



MA22822

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THE WORLD'S FINEST ELECTRONIC EQUIPMENT IN KIT FORM

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